

Claims

1. Actuator comprising an electric actuating motor, a transmission mechanism and an actuating element, it being possible for the actuating element to be brought into a specific position by the actuating motor being driven and also to be held in this position, and the actuating motor being a DC motor which comprises a first part with a number of permanent magnets distributed over the circumference and a second part which has pole teeth having windings, which are fed with commutated current, characterized in that

- a) the first part (20; 30; 40; 50) has alternately first zones having a low magnetic field strength (21; 31; 41; 51) and second zones having a high magnetic field strength (22; 32; 42; 52) over its circumference, the circumferential angle (23; 33; 43; 53) of the second zones (22; 32; 42; 52) being equal to the circumferential angle (28; 38; 48; 58) of the pole teeth (27; 37; 47; 57) of the second part (25; 35; 45; 55),
- b) the number of pole teeth (27; 37; 47; 57) distributed evenly over the circumference being selected such that all of the second zones (22; 32; 42; 52) are always passed at the same time by a pole tooth (27; 37; 47; 57),

c) with the result that, in the state in which there is no current flowing, an increased pulsating torque is exerted between the first part (20; 30; 40; 50) and the second part (25; 35; 45; 55).

2. Actuator according to Claim 1, characterized in that the first zones having a low magnetic field strength (21) and the second zones having a high magnetic field strength (22) are produced by the permanent magnet(s) (20) being magnetized variably over the circumference.

3. Actuator according to Claim 1, characterized in that at least some of the first zones having a low magnetic field strength (31) are formed by interspaces between two adjacent permanent magnets (32).

4. Actuator according to Claim 1, characterized in that at least some of the first zones having a low magnetic field strength (41) are created by the air gap (41') being enlarged in the radial direction in at least individual permanent magnets (42), whose circumferential angle (43) is a multiple of the circumferential angle (48) of the pole teeth (47).

5. Actuator according to Claim 1, characterized in that the circumferential angle (23'; 33'; 43'; 53') of at least some of the first zones having a low magnetic field strength (21; 31; 41; 51) is approximately equal to the circumferential angle (28'; 38'; 48', 58') of the interspaces

in the circumferential direction between the pole teeth (27; 37; 47; 57).

6. Actuator according to Claim 5, characterized in that this circumferential angle (23'; 33'; 43'; 53') is in the range between 0.2 and 0.3 times the circumferential angle (28; 38; 48; 58) of the pole teeth (27; 37; 47; 57).

7. Actuator according to Claim 1, characterized in that the thickness of the tips (39) of the pole teeth (27; 37; 47) in the radial direction is smaller than the distance between the tips of two adjacent pole teeth.

8. Actuator according to Claim 1, characterized in that the first part (20; 30; 40) is the stator, and the second part (25; 35; 45) is the inner rotor.

9. Actuator according to Claim 1, characterized in that the second part (55) is the stator, and the first part (50) is the inner rotor.

10. Controllable friction clutch having an actuator according to one of Claims 1 to 9.

11. Controllable friction clutch according to Claim 10, characterized in that the transmission mechanism (5) is a toothed gear, and the actuating element (6) comprises two ramp rings (13, 14) which can be rotated in relation to one another, of which at least one can be rotated via the transmission mechanism (5).